Wood Deck Guide

PERMIT(S) – WOOD DECKS

***** **ALL FEES DUE AT TIME OF APPLICATION**. *****

☐ **Building Permit Application**. Be aware of any subdivision restrictions prior to application. Complete application *with valid email address*. Approved permit will be emailed to applicant. Permits should be secured by person doing the work, homeowner or contractor. See DCA6-2012 in addition to attached documents. Contact inspector if using alternative methods or materials.

☐ **Plans.** Submit one (1) 8 ½" x 11" site plan. Indicate the following:
- Location of deck with dimensions and shape of deck;
- Distance from deck to all property lines and easements. Decks can only encroach into the rear yard setback by 15 feet. Total side lot setbacks must be at least 15'. Decks may not be built within an easement;
- Distance from deck to freestanding garage/shed (must be at least 10'); and
- Location of electric meter and electrical service line.

☐ **Construction Drawings.** Submit one (1) 8 ½" x 11" drawing that includes the following:
- Framing and section drawings;
- Stair details;
- Lumber species noted (otherwise weakest grade will be assumed);
- Beam and joist sizes & spans;
- Footing/post sizes;
- Ledger attachment method (if required);
- Guard post attachment (if required); and
- Manufacturer's installation instructions, if installing composite decking.

***** **START WORK ONLY AFTER PERMIT IS APPROVED** *****

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INSPECTIONS – SCHEDULE AT WWW.STERLING-HEIGHTS.NET

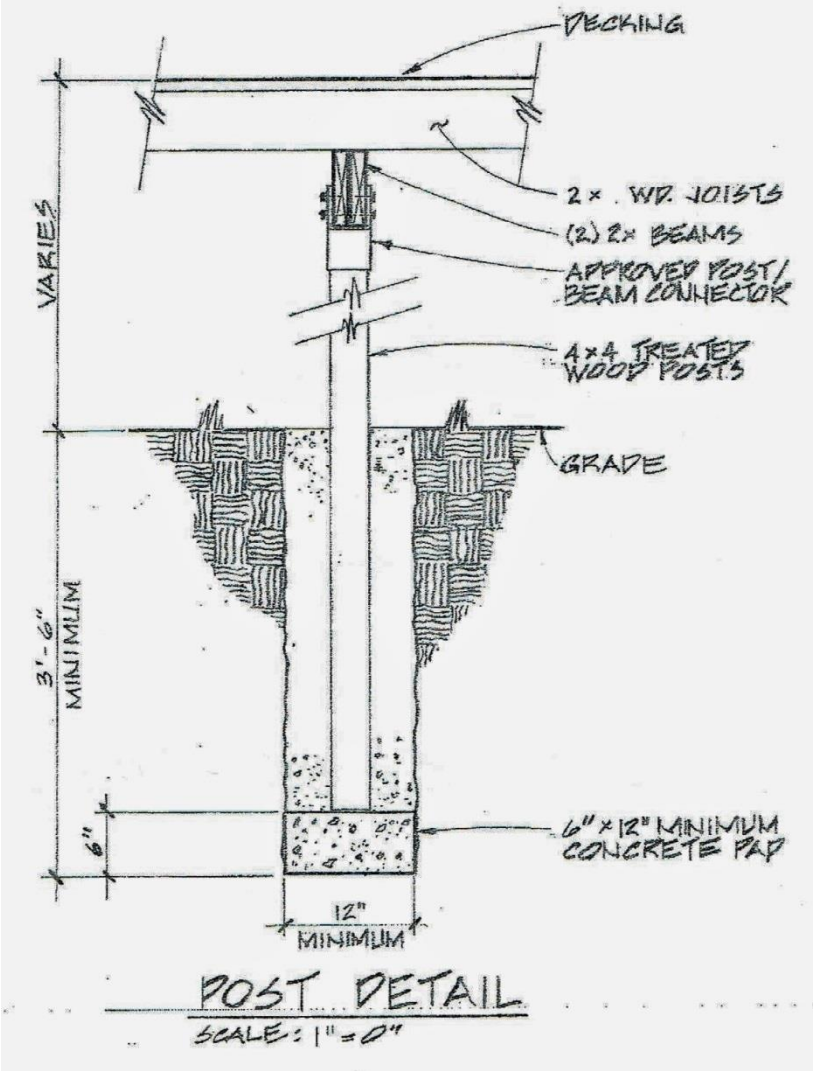
☐ **Building Post Hole Inspection.** Post holes to proper depth, correct spacing, solid bearing and concrete in place. If applicable, ledger installed (access to inside of house will be required for ledger).

☐ **Building Framing/Joist Inspection.** Required before deck board installation, only if deck is close to ground or has special framing considerations.

☐ **Building Final Inspection.** After installation is complete, including guard posts, handrails and steps.
- Beams fastened together, properly bearing and attached to posts;
- Required metal connectors installed;
- Joist spans correct, on center spacing correct;
- Guard height and baluster spacing correct;
- Appropriate glazing for hazardous locations; and
- Construction debris should be removed prior to inspection.

***** **HAVE APPROVED PLANS ON SITE FOR ALL INSPECTIONS** *****

FOOTINGS



A concrete footing with a minimum size of 12” round by 6’ deep shall be placed on undisturbed soil.

If the deck is attached to the house, the depth to the bottom of the footing shall be a minimum 42” deep. For decks 3 ft or more above grade- consult DCA6 for footing sizes(page 9)

Footings located within the basement overdig of the dwelling must extend to the level of the bottom of the dwellings basement footing

Backfill around the posts should be pea gravel or sand. Concrete is not allowed.

Figure 1: Post Hole/Footing Detail

LEDGER BOARD ATTACHMENT (IF APPLICABLE)

- Current residential code only allows 3 methods of attachment of ledger boards to the framing of the dwelling. Either with ½" lags or ½ inch bolts with nuts and washers. (MRC 2015, Table 507.2, 507.2.1)
- Ledger boards cannot be attached to framed overhangs or brick veneer.
- Ledger boards can be attached by approved fastening method to solid concrete foundation walls or grouted masonry blocks.

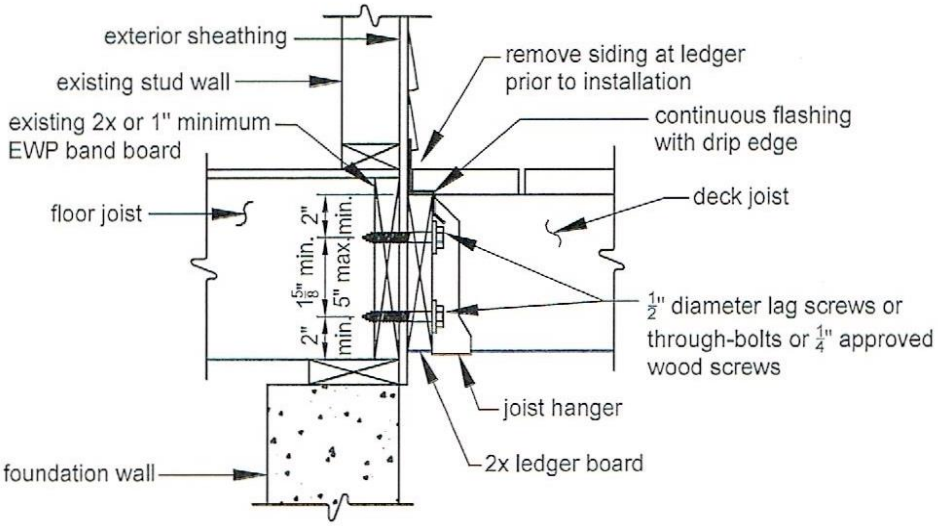


Figure 2: Ledger board attachment to dwellings rim joist

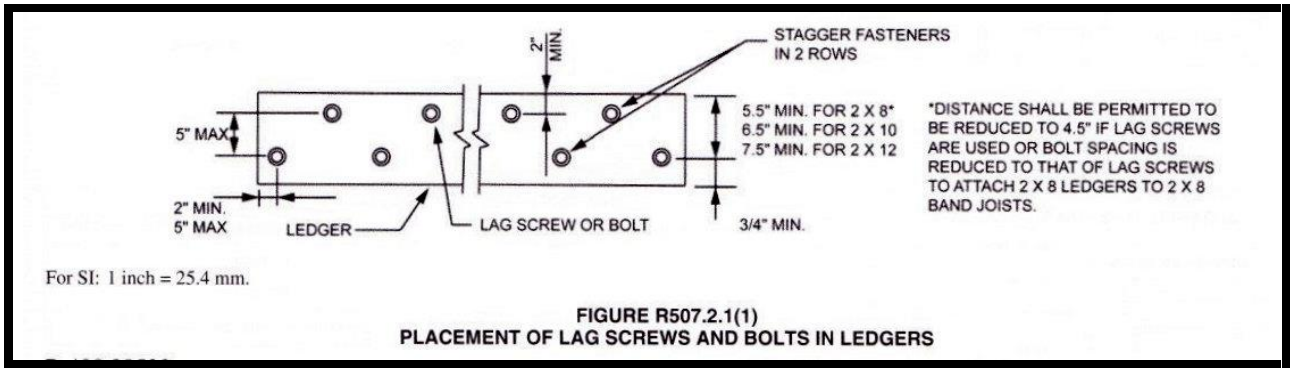


FIGURE R507.2.1(1)
PLACEMENT OF LAG SCREWS AND BOLTS IN LEDGERS

JOISTS

- Joist span is measured from centerlines of bearing locations at both ends.
- See Table 507.5 below for joist spans.
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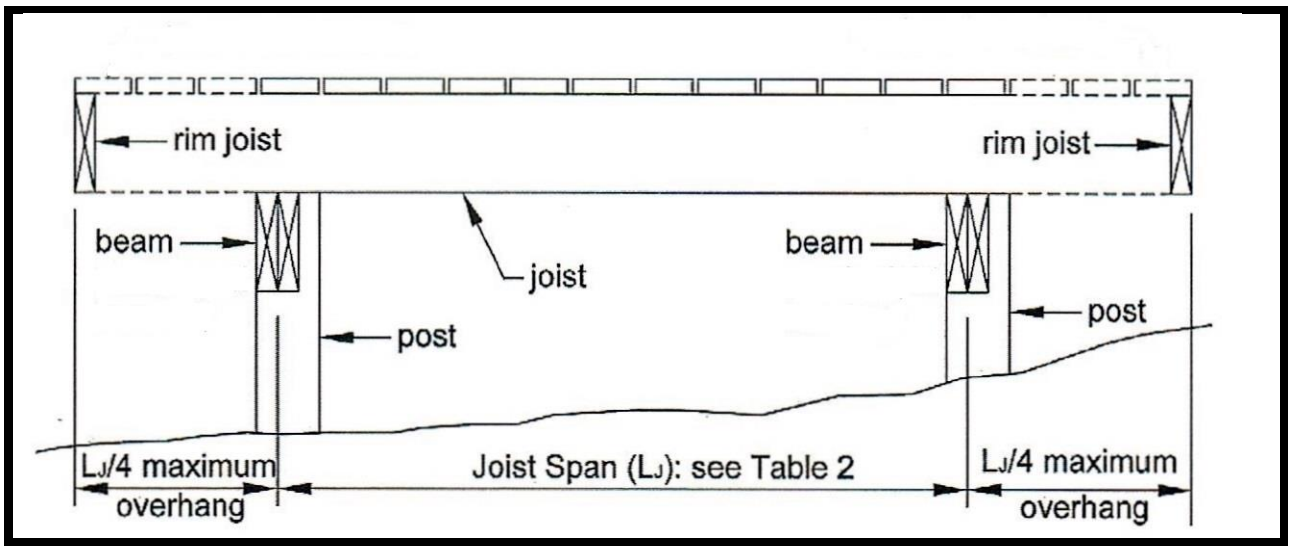


Figure 3: Typical Joist Span Detail for Free Standing Deck
For Deck Attached To House, Span is from Ledger to Center of Beam

TABLE R507.5
DECK JOIST SPANS FOR COMMON LUMBER SPECIES[f] (ft. - in.)

SPECIES[a]	SIZE	SPACING OF DECK JOISTS WITH NO CANTILEVER[b] (inches)			SPACING OF DECK JOISTS WITH CANTILEVERS[c] (inches)		
		12	16	24	12	16	24
Southern pine	2 × 6	9-11	9-0	7-7	6-8	6-8	6-8
	2 × 8	13-1	11-10	9-8	10-1	10-1	9-8
	2 × 10	16-2	14-0	11-5	14-6	14-0	11-5
	2 × 12	18-0	16-6	13-6	18-0	16-6	13-6
Douglas fir-larch[d], hem-fir[d] spruce-pine-fir[d]	2 × 6	9-6	8-8	7-2	6-3	6-3	6-3
	2 × 8	12-6	11-1	9-1	9-5	9-5	9-1
	2 × 10	15-8	13-7	11-1	13-7	13-7	11-1
	2 × 12	18-0	15-9	12-10	18-0	15-9	12-10
Redwood, western cedars, ponderosa pine[e], red pine[e]	2 × 6	8-10	8-0	7-0	5-7	5-7	5-7
	2 × 8	11-8	10-7	8-8	8-6	8-6	8-6
	2 × 10	14-11	13-0	10-7	12-3	12-3	10-7
	2 × 12	17-5	15-1	12-4	16-5	15-1	12-4

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa, 1 pound = 0.454 kg.

a. No. 2 grade with wet service factor.
b. Ground snow load, live load = 40 psf, dead load = 10 psf, L/Δ = 360.
c. Ground snow load, live load = 40 psf, dead load = 10 psf, L/Δ = 360 at main span, L/Δ = 180 at cantilever with a 220-pound point load applied to end.
d. Includes incising factor.
e. Northern species with no incising factor
f. Cantilevered spans not exceeding the nominal depth of the joist are permitted.

BEAMS

- Beam spans (distance between posts) shall be in accordance with table below.
- Beams are allowed to extend past the supporting posts(cantilevered) by ¼" the beam span (per table)
- Multiple member beams must be nailed together with either 10d nails or #10 wood screws, staggered in 2 rows, 16" on center.
- Beams must be positively supported to provide a continuous load path to the foundation.
- Decks more than 2' above grade shall be provided with diagonal bracing.

TABLE R507.6
DECK BEAM SPAN LENGTHS[a, b] (ft. - in.)

SPECIES[c]	SIZE[d]	DECK JOIST SPAN LESS THAN OR EQUAL TO: (feet)						
		6	8	10	12	14	16	18
Southern pine	2 – 2 × 6	6-11	5-11	5-4	4-10	4-6	4-3	4-0
	2 – 2 × 8	8-9	7-7	6-9	6-2	5-9	5-4	5-0
	2 – 2 × 10	10-4	9-0	8-0	7-4	6-9	6-4	6-0
	2 – 2 × 12	12-2	10-7	9-5	8-7	8-0	7-6	7-0
	3 – 2 × 6	8-2	7-5	6-8	6-1	5-8	5-3	5-0
	3 – 2 × 8	10-10	9-6	8-6	7-9	7-2	6-8	6-4
	3 – 2 × 10	13-0	11-3	10-0	9-2	8-6	7-11	7-6
	3 – 2 × 12	15-3	13-3	11-10	10-9	10-0	9-4	8-10
Douglas fir-larch[e], hem-fir[e], spruce-pine-fir[e], redwood, western cedars, ponderosa pine[f], red pine[f]	3 × 6 or 2 – 2 x 6	5-5	4-8	4-2	3-10	3-6	3-1	2-9
	3 × 8 or 2 – 2 × 8	6-10	5-11	5-4	4-10	4-6	4-1	3-8
	3 × 10 or 2 – 2 × 10	8-4	7-3	6-6	5-11	5-6	5-1	4-8
	3 × 12 or 2 – 2 × 12	9-8	8-5	7-6	6-10	6-4	5-11	5-7
	4 × 6	6-5	5-6	4-11	4-6	4-2	3-11	3-8
	4 × 8	8-5	7-3	6-6	5-11	5-6	5-2	4-10
	4 × 10	9-11	8-7	7-8	7-0	6-6	6-1	5-8
	4 × 12	11-5	9-11	8-10	8-1	7-6	7-0	6-7
	3 – 2 × 6	7-4	6-8	6-0	5-6	5-1	4-9	4-6
	3 – 2 × 8	9-8	8-6	7-7	6-11	6-5	6-0	5-8
	3 – 2 × 10	12-0	10-5	9-4	8-6	7-10	7-4	6-11
	3 – 2 × 12	13-11	12-1	10-9	9-10	9-1	8-6	8-1

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa, 1 pound = 0.454 kg.

a. Ground snow load, live load = 40 psf, dead load = 10 psf, L/Δ = 360 at main span, L/Δ = 180 at cantilever with a 220-pound point load applied at the end.

b. Beams supporting deck joists from one side only.

c. No. 2 grade, wet service factor.

d. Beam depth shall be greater than or equal to depth of joists with a flush beam condition.

e. Includes incising factor.

f. Northern species. Incising factor not included.

1) When equal joist spans from opposite sides of a single beam, the above table can be used but the figure for twice the joist span must be used.

2) Table is set up for the weaker of the most common species used for treated lumber. For more extensive tables, please refer to DCA6 and your supplier.

DECKING

- Decking shall be either 2” or 5/4” nominal lumber. Joist spans are dependent of the decking size and orientation(see chart below). Composite decking shall be labelled indicating compliance with ASTM D 7032 and installed in accordance with the manufacturer’s instructions.

TABLE R507.4
MAXIMUM JOIST SPACING

MATERIAL TYPE AND NOMINAL SIZE	MAXIMUM ON-CENTER JOIST SPACING	
	Perpendicular to joist	Diagonal to joist[a]
$1^{1}/_{4}$-inch-thick wood	16 inches	12 inches
2-inch-thick wood	24 inches	16 inches
Plastic composite	In accordance with Section R507.3	In accordance with Section R507.3

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 degree = 0.01745 rad.
a. Maximum angle of 45 degrees from perpendicular for wood deck boards

POSTS

TABLE R507.8
DECK POST HEIGHT[a]

DECK POST SIZE	MAXIMUM HEIGHT[a]
4 × 4	8'
4 × 6	8'
6 × 6	14'

For SI: 1 foot = 304.8 mm.
a. Measured to the underside of the beam.

Figure 4: Beam to Post Attachment

FASTENERS & CONNECTORS

- Fasteners shall be hot-dipped zinc-coated galvanized steel, stainless steel, silicone bronze or copper.
- All joist hangers, beam to post connectors, hurricane clips etc. are to be either galvanized or stainless steel.
- Carriage bolts are not allowed in any structural connections.

DIAGONAL BRACING

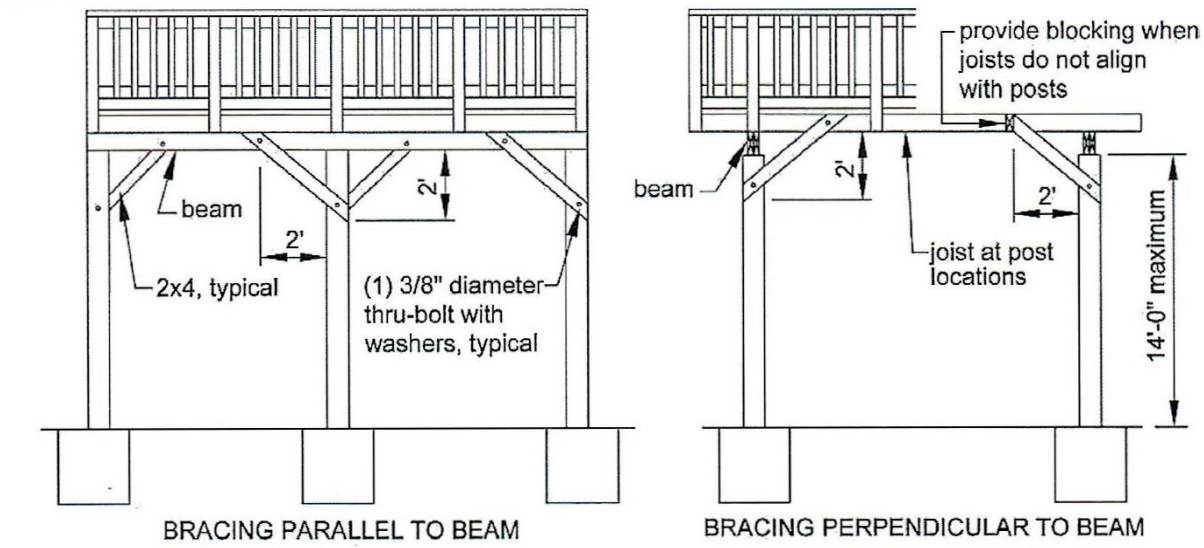


Figure 5: Diagonal Bracing

Decks more than 24” above grade shall be provided with diagonal bracing. Bracing shall be both parallel and perpendicular to the beam, should be a minimum 2 x4 through-bolted with 1 3/8” dia. bolt.

HANDRAILS

- Handrails are required on all stairs with four or more risers. Handrail height is 34” to 38” to the top, measured perpendicular from the nosing.
- Handrail diameter is between 1 ¼” to 2”.

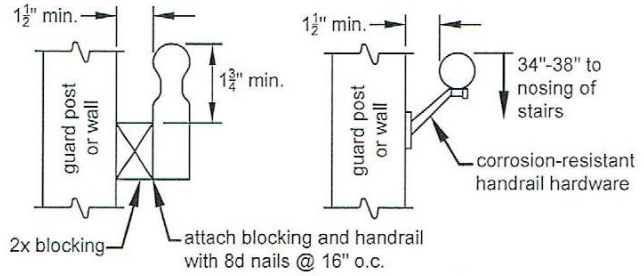


Figure 6A: Typical Handrail Attachment

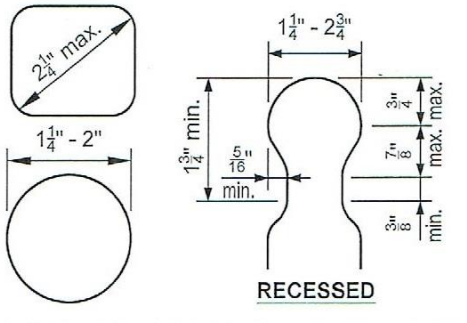


Figure 6B: Handrail Graspability

GUARDS

- Guards required when walking surface is more than 30” from grade below it, at any point within 36” horizontally from the edge of the walking surface.
- Guards are required on stairs that have a total rise in excess of 30”.
- Guards are required to be 36” high from the walking surface (34” for stairs).
- If fixed seating is installed at the edge of the deck, the height of the seating is considered that walking surface when determining the minimum height of the guard.
- Guards shall not have openings that permit the passage of a 4” sphere.
- Guards must be able to withstand a concentrated load at the top rail of the guard of 200 lbs. (Please refer to DCA6 for accepted methods)
- If a guard is not required by the code, dimensional code requirements do not have to be met but the guard must meet load requirements of the code.

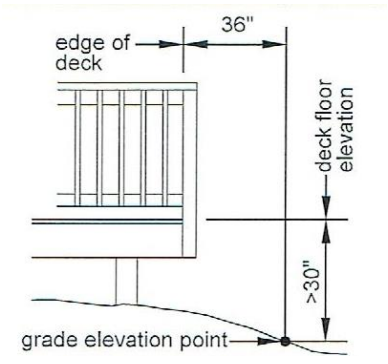


Figure 7A: When a guard is required

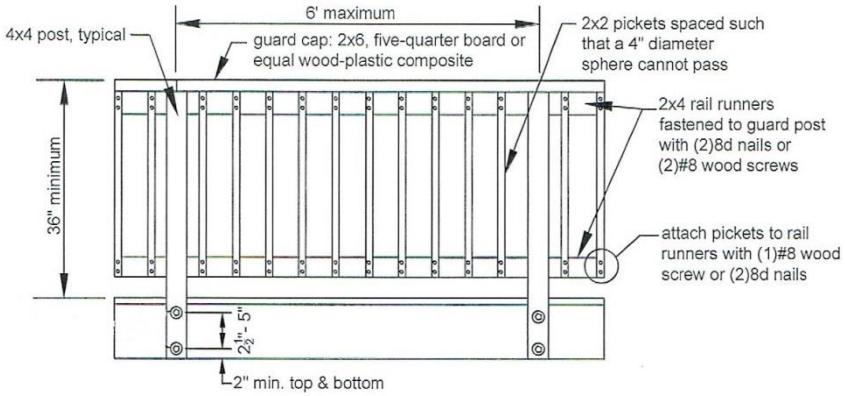


Figure 7B: Dimensional requirements for guards

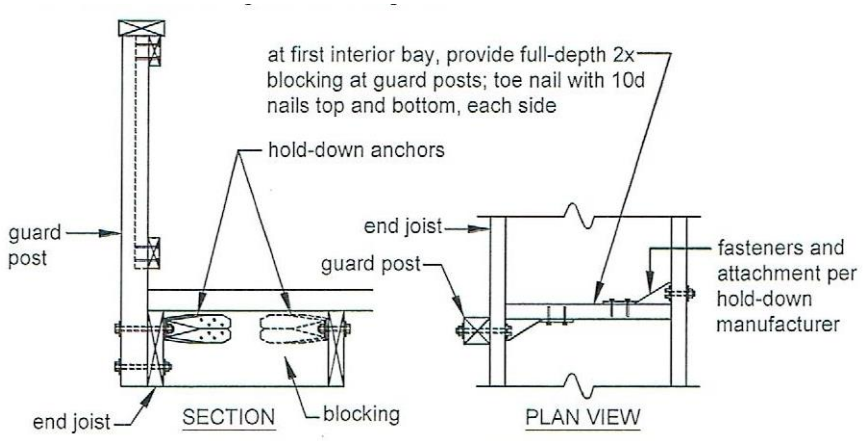


Figure 8: Approved Guard Post to End Joist Attachment

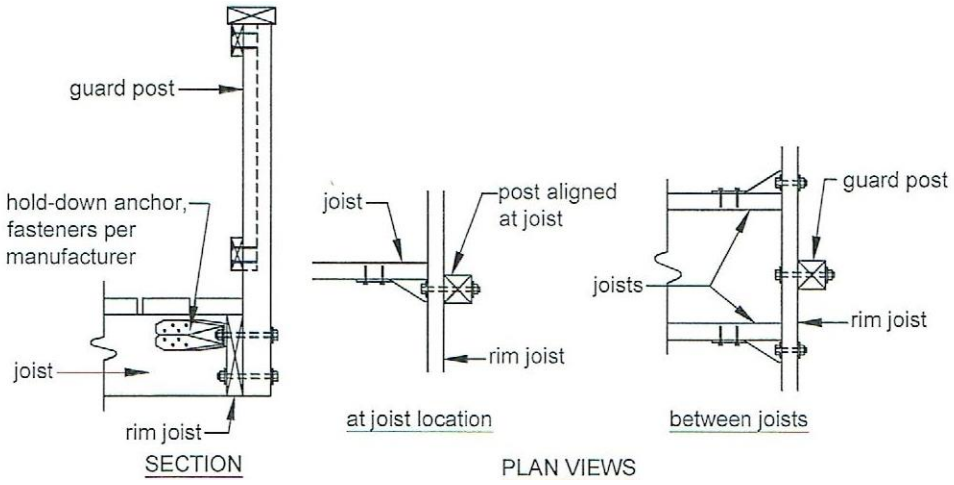


Figure 9: Approved Guard Post to Rim Joist Attachment

STAIRS

- Stair width minimum is 36”.
- Treads shall be made of 2 X wood materials.
- Minimum depth of single tread is 9”.
- Maximum height of an individual riser is 8 ¼”.
- The difference between the maximum rise and the minimum rise in a set of stairs shall not exceed 3/8 of an inch.
- A ¾” to 1 ¼” nosing is required at each tread.
- Risers can be made of solid 1 X material or can be open as long as a 4” sphere cannot pass through.
- Stair stringers shall be solid 2 x 12 and placed at least 18” on center.

- Stairs with a total rise of over 30” shall have the bottom of the stringers rest on a 42” deep footing. Those under 30” in total rise need to bear on solid soil or slab on grade.
- Stairs shall be attached to the deck structure with approved metal straps.
- Maximum stringer spans shall be in accordance with Figure X.

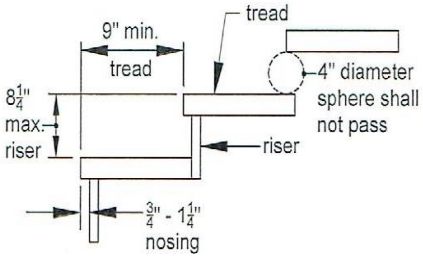


Figure 10: Stair Geometry

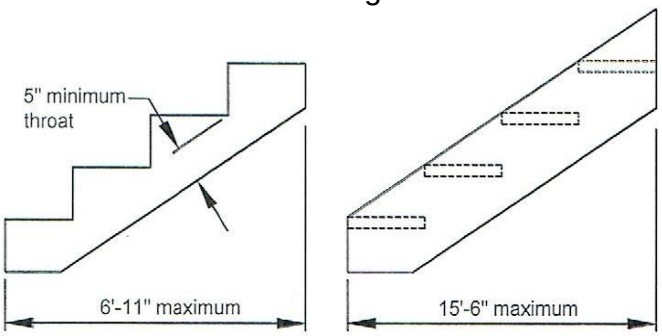


Figure 11: Maximum Stringer Span

SAFETY GLAZING

A deck addition to an existing house may create areas where the glazing is now considered a hazardous location requiring tempered or laminated glass or a guard (glass block windows may be used under certain conditions). Below are some of the conditions that are considered hazardous:

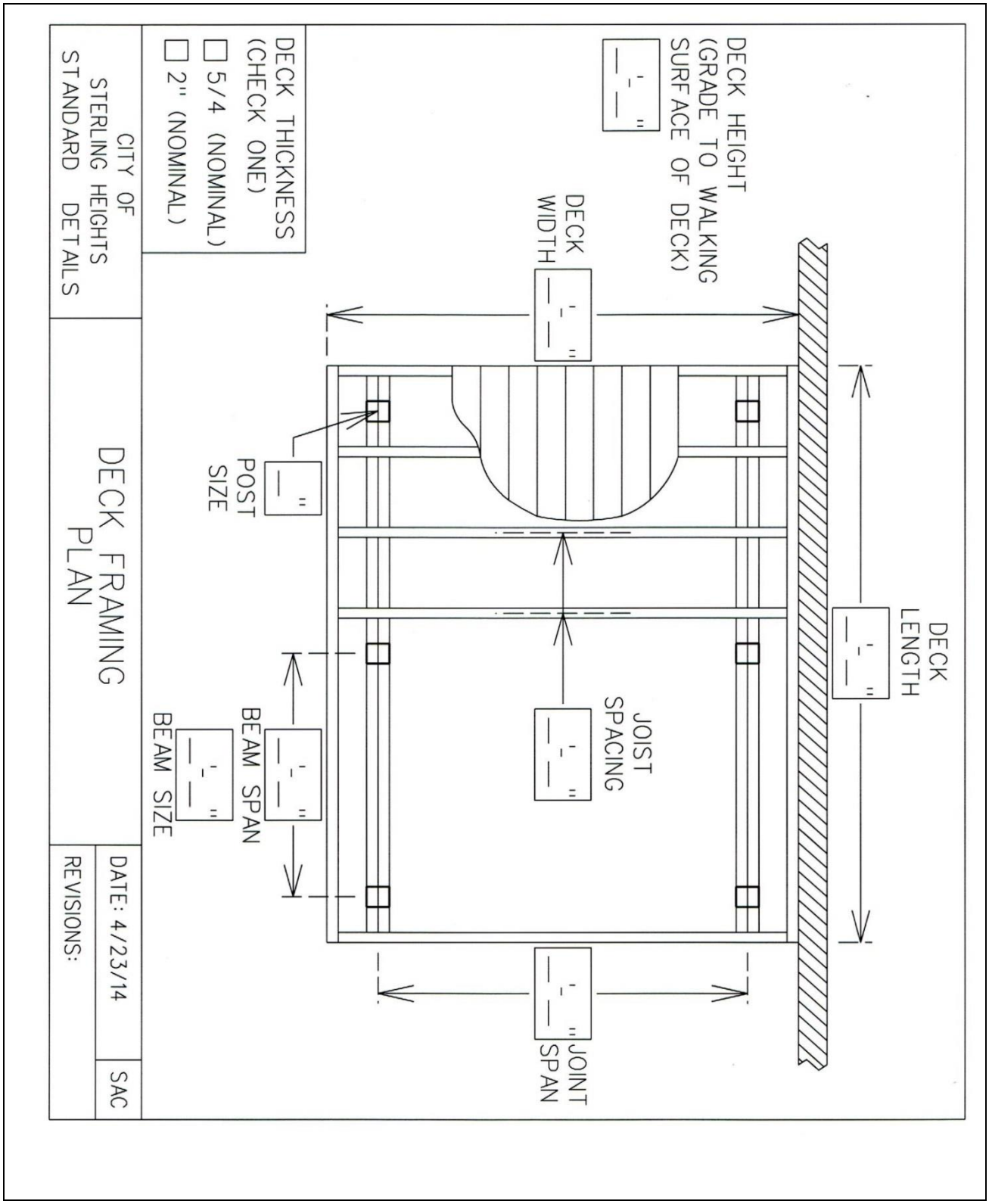
- An individual pane of glass where all of the following occurs:
  - Bottom edge of glass is less than 18” above the walking surface.
  - The top edge of glass is more than 36” from the walking surface.
  - The glass is greater than 9 square feet in area.

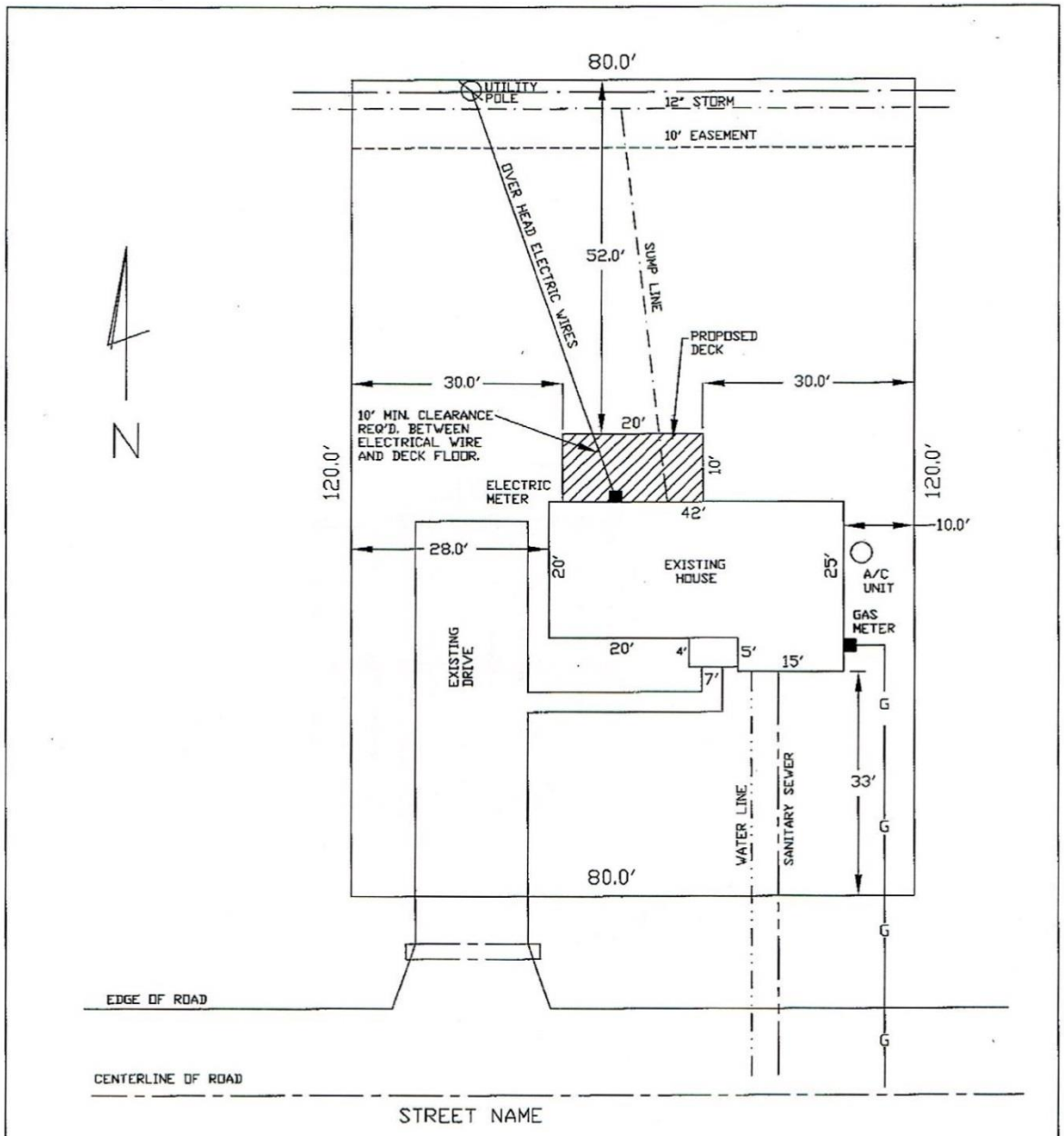
- Glazing within 36” of a stair or landing walking surface which is less than 60” from the walking surface.

- Glazing within 60” of the bottom tread of a stair that is also less than 60’ from the floor below.

Additional Questions?

Refer to The Michigan Residential Code 2015, the DCA6 or ask the Building Inspector.


DECK HEIGHT
(GRADE TO WALKING
SURFACE OF DECK)
DECK
WIDTH
DECK
LENGTH
POST
SIZE
JOIST
SPACING
BEAM SPAN
BEAM SIZE
JOINT
SPAN
DECK THICKNESS
(CHECK ONE)
☐ 5/4 (NOMINAL)
☐ 2" (NOMINAL)
CITY OF
STERLING HEIGHTS
STANDARD DETAILS
DECK FRAMING
PLAN
DATE: 4/23/14
SAC
REVISIONS:



SAMPLE PLOT PLAN

Address:	
Sterling Heights, Mi	Zip Code:
Owner:	
Builder:	

SHOW THE UTILITY LOCATIONS BOTH ABOVE AND BELOW GROUND.
SHOW THE LOCATION OF THE ELECTRIC METER, GAS METER AND A/C UNIT.
SHOW THE LOCATION OF WATER, SANITARY, AND SUMP LINES